CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No.: CTCE/BBMP/BRD/W.No.05/CSR-03/287b/CEMENT/2016-17 Date: 06.03.2017

TEST REPORT ON CEMENT

* Customer	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. B.R. Dhananjaya,** Nagashettyhalli, Bangalore - 94.
* Name of Work	:	Development works at Sampigehalli in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
* Reference	:	EE/BTP/BBMP/E-PMT/595/2013-14 Dated: 03.03.2014
* Sample ID	:	Cement
Sample Received on	:	03.03.2017
Period of Testing	:	03.03.2017 to 06.03.2017

The results of the tests conducted on the cement sample are as follows:

Sl. No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-2013
1	Standard Consistency	IS-4031 (Part -4) 1988 (RA-2014)	29.00 %	-
2	a) Initial Setting Time	IS-4031 (Part -5) 1988 (RA-2014)	160 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5) 1988 (RA-2014)	480 Minutes	Not More than 600 Minutes
3	Soundness by Le Chartlier Method	IS-4031 (Part-3) 1988 (RA-2014)	1 mm	Not more than 10mm

*Information is furnished by the Customer/Representative.

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****

VIDYARANI P.K.
Technical Manager

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/BRD/W.No.05/CSR-03/287b/SAND-Gradation/2016-17 06.03.2017

TEST REPORT ON SIEVE ANALYSIS OF FINE AGGREGATES

* Customer	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. B.R. Dhananjaya,** Nagashettyhalli, Bangalore - 94.
* Name of Work	:	Development works at Sampigehalli in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
* Reference	:	EE/BTP/BBMP/E-PMT/595/2013-14 Dated: 03.03.2014
* Sample ID	:	Fine Aggregates
Technical Reference	:	IS : 2386 (Part 1) - 1963 (RA-2011)
Sample Received On	:	03.03.2017
Date of Testing	:	06.03.2017

Total Wt. of Aggregates in gms = **1000**

IS Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2011)			
		Zone-I	Zone-II	Zone-III	Zone-IV
10	100	100	100	100	100
4.75	96.10	90-100	90-100	90-100	95-100
2.36	79.90	60-95	75-100	85-100	95-100
1.18	58.40	30-70	55-90	75-100	90-100
600 Micron	30.40	15-34	35-59	60-79	80-100
300 Micron	14.80	5-20	8-30	12-40	15-50
150 Micron	6.80	0-10	0-10	0-10	0-15

* Information is furnished by the Customer/Representative

Remarks : This sample is under Zone-I specific limits.

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Technical Manager

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E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/BRD/W.No.05/CSR-03/287b/AGG/GR/2016-17 06.03.2017

TEST REPORT ON SIEVE ANALYSIS OF COARSE AGGREGATES

* Customer	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. B.R. Dhananjaya,** Nagashettyhalli, Bangalore - 94.
* Name of Work	:	Development works at Sampigehalli in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
* Reference	:	EE/BTP/BBMP/E-PMT/595/2013-14 Dated: 03.03.2014
* Sample ID	:	Coarse Aggregates (40mm)
Technical Reference	:	IS : 2386 (Part 1) -1963 (RA-2011)
Sample Received on	:	03.03.2017
Date of Testing	:	06.03.2017

Total Wt. of Aggregates in gms= **5000**

IS Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2011)	
		Graded	Single Sized
80	100	100	-
63	100	-	100
40	97.10	95-100	85-100
20	37.10	30-70	0-20
10	16.70	10-35	0-5
4.75	4.46	0-5	-

* Information is furnished by the Customer/Representative

Remarks : This sample is under graded specific limits.

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Technical Manager

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Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/BRD/W.No.05/AC/Steel/2016-17 06.03.2017

TEST REPORT ON REINFORCEMENT STEEL

* Customer	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. B.R. Dhananjaya,** Nagashettyhalli, Bangalore - 94.
* Name of work	:	Development works at Sampigehalli in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
* Reference	:	EE/BTP/BBMP/E-PMT/595/2013-14 Dated: 03.03.2014
* Samples ID	:	10 mm Bar
Technical Reference	:	IS: 1786-2008
Date of Testing	:	06.03.2017

Sl No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm2	Tensile strength (Ultimate stress) N/mm2	Elongation percent gauge length		
1	10	0.62	513	515	13.25	O.K	O.K

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Civil-tech Consultants & Engineers
#23/14, 7th Cross, 3rd Stage, 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

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T-2377

Job No.: CTCE/BBMP/BRD/W.No.05/CSR-03/287b/Cube/2016-17 10.04.2017

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

* Customer	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. B.R. Dhananjaya,** Nagashettyhalli, Bangalore - 94.
* Name of the work	:	Development works at Sampigehalli in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
* Reference	:	EE/BTP/BBMP/E-PMT/595/2013-14 Dated: 03.03.2014
* Sample ID	:	Cement Concrete
Technical Reference	:	IS: 516-1959 (RA-2013)
Size of cubes	:	150mmx150mmx150mm
Cross Sectional Area	:	22500 mm^2
* Grade of Concrete	:	M_{15}
Compressive Strength as on	:	28^{th} day
Sample Received on	:	10.04.2017

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	13.03.2017	10.04.2017	8.135	369.6	16.43
2	13.03.2017	10.04.2017	8.298	379.3	16.86
3	13.03.2017	10.04.2017	8.332	386.3	17.17

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VIDYARANI P.K.
Technical Manager

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/BRD/W.No.05/CSR-03/287b/Cube/2016-17 13.04.2017

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

* Customer	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. B.R. Dhananjaya,** Nagashettyhalli, Bangalore - 94.
* Name of the work	:	Development works at Sampigehalli in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
* Reference	:	EE/BTP/BBMP/E-PMT/595/2013-14 Dated: 03.03.2014
* Sample ID	:	Cement Concrete
Technical Reference	:	IS: 516-1959 (RA-2013)
Size of cubes	:	150mmx150mmx150mm
Cross Sectional Area	:	22500 mm^2
* Grade of Concrete	:	M_{20}
Compressive Strength as on	:	28^{th} day
Sample Received on	:	13.04.2017

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	16.03.2017	13.04.2017	8.206	478.3	21.26
2	16.03.2017	13.04.2017	8.325	506.2	22.50
3	16.03.2017	13.04.2017	8.359	516.8	22.97

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Technical Manager

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Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/BRD/W.No.05/WMM/Gradation/2016-17 06.03.2017

TEST REPORT ON GRADATION OF WET MIX MACADAM

* Customer	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. B.R. Dhananjaya,** Nagashettyhalli, Bangalore - 94.
* Name of Work	:	Development works at Sampigehalli in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
* Reference	:	EE/BTP/BBMP/E-PMT/595/2013-14 Dated: 03.03.2014
Sample ID	:	Wet Mix Macadam
Technical Reference	:	IS 2386 (part-1)1963 (RA-2011)
Date of Testing	:	06.03.2017

Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits As per Morth Table 400-13
53	0	0	0	100	100
45	105	105	2.1	97.9	95-100
22.4	1520	1625	32.50	67.50	60-80
11.2	1090	2715	54.30	45.70	40-60
4.75	560	3275	65.50	34.50	25-40
2.36	425	3700	74.00	26.00	15-30
0.600	480	4180	83.60	16.40	8-22
0.075	630	4810	96.20	3.80	0-8

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Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

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Job No.: CTCE/BBMP/BRD/W.No.05/WMM/Gradation/2016-17 13.03.2017

TEST REPORT ON GRADATION OF WET MIX MACADAM

* Customer	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. B.R. Dhananjaya,** Nagashettyhalli, Bangalore - 94.
* Name of Work	:	Development works at Sampigehalli in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
* Reference	:	EE/BTP/BBMP/E-PMT/595/2013-14 Dated: 03.03.2014
Sample ID	:	Wet Mix Macadam
Technical Reference	:	IS 2386 (part-1)1963 (RA-2011)
Date of Testing	:	13.03.2017

Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits As per Morth Table 400-13
53	0	0	0	100	100
45	180	180	3.6	96.4	95-100
22.4	1605	1785	35.70	64.30	60-80
11.2	1020	2805	56.10	43.90	40-60
4.75	585	3390	67.80	32.20	25-40
2.36	475	3865	77.30	22.70	15-30
0.600	490	4355	87.10	12.90	8-22
0.075	520	4875	97.50	2.50	0-8

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AE ward no 5

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Job No.: CTCE/BBMP/BRD/W.No.05/WMM/Gradation/2016-17 17.03.2017

TEST REPORT ON GRADATION OF WET MIX MACADAM

* Customer	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. B.R. Dhananjaya,** Nagashettyhalli, Bangalore - 94.
* Name of Work	:	Development works at Sampigehalli in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
* Reference	:	EE/BTP/BBMP/E-PMT/595/2013-14 Dated: 03.03.2014
Sample ID	:	Wet Mix Macadam
Technical Reference	:	IS 2386 (part-1)1963 (RA-2011)
Date of Testing	:	17.03.2017

Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits As per Morth Table 400-13
53	0	0	0	100	100
45	135	135	2.7	97.3	95-100
22.4	1590	1725	34.50	65.50	60-80
11.2	1050	2775	55.50	44.50	40-60
4.75	560	3335	66.70	33.30	25-40
2.36	485	3820	76.40	23.60	15-30
0.600	505	4325	86.50	13.50	8-22
0.075	505	4830	96.60	3.40	0-8

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#23/14, 7th Cross, 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

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Job No.: CTCE/BBMP/BRD/W.No.05/WMM/AIV/2016-17 06.03.2017

TEST REPORT ON IMPACT VALUE OF AGGREGATE

* Customer	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. B.R. Dhananjaya,** Nagashettyhalli, Bangalore - 94.
* Name of Work	:	Development works at Sampigehalli in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
* Reference	:	EE/BTP/BBMP/E-PMT/595/2013-14 Dated: 03.03.2014
* Sample ID	:	Wet Mix Macadam
Technical Reference	:	IS : 2386(Part -4)-1963 (RA-2011)
Date of Testing	:	06.03.2017

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	382	383	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	80	81	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	302	
4	Aggregate Impact value = percent fines 100* (W2/W1)%	20.94	21.15	**21.05**

*Information is furnished by the Customer/Representative.

Comments:

→ Maximum allowable Aggregate Impact value for Wet Mix Macadam is 30%

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#23/14, 7th Cross, 3rd Stage, 4th Block,
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Basaveshwaranagar, Bangalore-560 079.

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Job No.: CTCE/BBMP/BRD/W.No.05/WMM/Shape.T/2016-17 06.03.2017

TEST REPORT ON FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

* Customer	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. B.R. Dhananjaya,** Nagashettyhalli, Bangalore - 94.
* Name of Work	:	Development works at Sampigehalli in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
* Reference	:	EE/BTP/BBMP/E-PMT/595/2013-14 Dated: 03.03.2014
* Sample ID	:	Wet Mix Macadam
Technical Reference	:	IS 2386(Part 1) 1963 (RA 2011)
Date of Testing	:	06.03.2017

Sl.No.	Description	Result
1	Flakiness Index	11.62%
2	Elongation Index	13.25%
3	Combined Flakiness & Elongation Index	24.87%

*Information is furnished by the Customer/Representative.

Civil-Tech Consultants & Engineers Bangalore

Comments:

→ Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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BS ward No 05

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Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

CIVIL-TECH CONSULTANTS AND ENGINEERS

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Job No.: CTCE/BBMP/BRD/W.No.05/SDBC/Bitumen/2016-17 24.04.2017

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

* Customer	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	**Mr. B.R. Dhananjaya,** Nagashettyhalli, Bangalore - 94.
* Name of Work	Development works at Sampigehalli in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
* Reference	EE/BTP/BBMP/E-PMT/595/2013-14 Dated: 03.03.2014
SAMPLE I/D	Roads in Sampigehalli in Ward No.05
DATE OF TESTING	24.04.2017

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475.5	473.5
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	24.5	26.50
7. Bitumen content in %	4.90	5.30
8. Average	**5.10**	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	33.39	7.02	7.02	92.98	90-100
4.75	265.3	55.79	62.82	37.18	35-51
2.36	33.25	6.99	69.81	30.19	24-39
1.18	46.65	9.81	79.62	20.38	15-30
0.3	42.32	8.90	88.52	11.48	9-19
0.075	25.62	5.39	93.91	6.09	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	30.21	6.04	6.04	93.96	90-100
4.75	258.2	51.64	57.68	42.32	35-51
2.36	61.28	12.26	69.94	30.06	24-39
1.18	44.21	8.84	78.78	21.22	15-30
0.3	32.26	6.45	85.23	14.77	9-19
0.075	43.36	8.67	93.90	6.10	3-8

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#23/14, 7th Cross, 3rd Stage, 4th Block,
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Basaveshwaranagar, Bangalore-560 079.

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.

Tele Fax : 23223227, Website : www.civiltechconsultants.com

E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/BRD/W.No.05/SDBC/AIV/2016-17 24.04.2017

TEST REPORT ON AGGREGATE IMPACT VALUE

* Customer	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. B.R. Dhananjaya,** Nagashettyhalli, Bangalore - 94.
* Name of the Work	:	Development works at Sampigehalli in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
* Reference	:	EE/BTP/BBMP/E-PMT/595/2013-14 Dated: 03.03.2014
* Sample ID	:	Semi Dense Bituminous Concrete
Technical Reference	:	IS : 2386 (Part-4)-1963 (RA-2011)
Type of Mix	:	Hot Mix Plant, Bangalore
Date of Testing	:	24.04.2017

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	379	382	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	78	79	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	303	
4	Aggregate Impact value = percent fines $100^* (W_2/W_1)\%$	20.58	20.68	20.63

* Information is furnished by the Customer/Representative

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

Note:

⇒The report shall not be reproduced, except in full, without the written approval of the laboratory.

⇒The results indicated above are based on the tests carried out on the samples received in the laboratory.

⇒Any Query regarding the report must be reported within 30 days from the date of testing.

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Civil-tech Consultants & Engineers
#23/14, 7th Cross 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/BRD/W.No.05/SDBC/Shape_T/2016-17 24.04.2017

TEST REPORT ON FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

* Customer	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. B.R. Dhananjaya,** Nagashettyhalli, Bangalore - 94.
* Name of Work	:	Development works at Sampigehalli in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
* Reference	:	EE/BTP/BBMP/E-PMT/595/2013-14 Dated: 03.03.2014
Sample ID	:	Semi Dense Bituminous Concrete
Technical Reference	:	IS : 2386(Part -1)-1963 (RA-2011)
Date of Testing	:	24.04.2017

Sl.No.	Description	Result
1	Flakiness Index	11.85%
2	Elongation Index	13.62%
3	Combined Flakiness & Elongation Index	25.47%

* Information is furnished by the Customer/Representative

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Civil-tech Consultants & Engineers
#23/14, 7th Cross 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/BRD/W.No.05/SDBC/Stripping/2016-17 24.04.2017

TEST REPORT ON STRIPPING VALUE OF ROAD AGGREGATES (STATIC IMMERSION TEST)

* Customer	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. B.R. Dhananjaya,** Nagashettyhalli, Bangalore - 94.
* Name of the work	:	Development works at Sampigehalli in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
* Reference	:	EE/BTP/BBMP/E-PMT/595/2013-14 Dated: 03.03.2014
* Sample ID	:	Semi Dense Bituminous Concrete
Technical Reference	:	IS: 6241
Date of Testing	:	24.04.2017

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping,	Average,	Average Retained
1	3.3	3.40	96.60
2	3.4		
3	3.5		

* Information is furnished by the Customer/Representative

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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AE Ward No 6

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Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

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Job No.: CTCE/BBMP/BRD/W.No.05/SDBC/Sp_Wa/2016-17 24.04.2017

TEST REPORT ON SPECIFIC GRAVITY AND WATER ABSORPTION TEST

* Customer	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. B.R. Dhananjaya,** Nagashettyhalli, Bangalore - 94.
* Name of the Work	:	Development works at Sampigehalli in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
* Reference	:	EE/BTP/BBMP/E-PMT/595/2013-14 Dated: 03.03.2014
* Sample ID	:	Semi Dense Bituminous Concrete
Technical Reference	:	IS : 2386 (Part-3)-1963 (RA-2011)
Type of Mix	:	Hotmix Plant, Bangalore
Date of Testing	:	24.04.2017

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2020	2021	2022	
2	Weight of basket suspended in water	W_2 g	755	2020	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1265	1266	1267	
4	Weight of saturated surface dry aggregate in air	W_3 g	2013	2014	2015	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	748	748	748	
6	Weight of oven dried aggregate	W_4 g	2006	2005	2004	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.682	2.680	2.679	2.680
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.707	2.713	2.719	2.713
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.35%	0.45%	0.55%	0.45%

* Information is furnished by the Customer/Representative

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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#23/14, 7th Cross 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwarahagar, Bangalore-560 079.

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